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Abstract

The aim of this paper is to analyze whether parents' fertility decisions may be an important determinant of the future fertility decisions of their children in Spain. To address this issue, we use data from the Survey of Living Conditions (2011). Our results confirm the intergenerational transmission of fertility decisions in Spain. The higher the parents' number of children, the higher the number of children that individuals have.

Keywords: Fertility, Intergenerational transmission, Spain.

JEL Codes: D10, J13, Z13

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1. Introduction

In the last years, the total fertility rate has fallen significantly in many countries and does not appear to be bottoming out. In Spain, it has dropped to worrying levels below the replacement rate, set at 2.1 children per woman (see figure 1) which points out the necessity to analyze the factors that may explain these low levels of fertility. Several studies have contributed to understanding the progressive decline in the fertility rate, focusing on the increase in the participation of women in the labor market (Ahn and Mira, 2002; Brewster and Rindfuss, 2000; Engelhardt et al., 2004), the increased opportunity cost of women's time (Becker, 1981), technological progress (Greenwood and Seshadri, 2002), the decline in infant mortality rates (Doepke, 2005), the reform of the laws that have made birth control and abortion more accessible (Ananat et al., 2007; Goldin and Katz, 2000, 2002; Guldi, 2008), the public debt (Fanti and Spataro, 2013), and the introduction of reforms in divorce laws (Bellido and Marcen, 2014), among others.

Although all of these factors, separately and together, can influence the evolution of fertility rates, it cannot explain the existence of large differences in fertility outcomes across Spanish regions (INE, 2019). In this paper, we study the intergenerational transmission of fertility decisions in Spain by focusing on culture as one possible channel through which parents affect their offspring's decisions. Using methodologies analogous to ours, there are recent papers showing the vertical transmission (that is, from parents to their children), of teenage smoking (Rodríguez-Planas, N., and Sanz-de-Galdeano, A. 2019), entrepreneurial activity (Ferrando-Latorre et al., 2019), body mass (Dolton, P., and Xiao, M. 2017), housework time (Marcén and Morales, 2020), unemployment status (Morales, 2019) and homeownership status (Morales, 2020). Similar to our study are those of Salari (2018) and Marcén and Morales (2018). Using a sample of immigrants living in the United States, they provide evidence of the existence of a cultural effect by showing a positive relationship between their fertility behavior and that of their counterparts in their country of ancestry. However, few studies focus on understanding the mechanism through which fertility culture is transmitted. To our knowledge, none of the prior literature examines the issue propose here, that is the vertical transmission of fertility decisions from parents to their children, for the specific case of Spain.

In our empirical strategy, we use data from the Survey of Living Conditions (2011) provided by the Spanish Statistical Institute, for the latest year, providing information about the household characteristics when individuals were teenagers. We study the transmission of fertility decisions over two generations by analyzing whether the parent's decision about how many children have can affect the number of children their daughters and sons have in the future. We find a positive and statistically significant relationship between the number of children that individuals have and that of their parents. We also find that belonging to a large family when individuals were teenagers increases the probability of having 3 or more children in adulthood. Our results are unaffected after controlling for unobservable characteristics by region, including region fixed effects, and using different subsamples. We can interpret our findings as evidence of the intergenerational transmission of fertility decisions in Spain.

2. Empirical strategy

In our empirical strategy, we use the parents' number of children and the parents' large family choice when individuals were teenagers as our measures of fertility culture.[1] If there is no vertical transmission of fertility decisions in Spain, parents' decisions on the number of children, should have no impact on the future number of children of their daughters and sons. On the other hand, if culture transmitted through parents to their children does play a role in fertility decisions, we would expect to detect a relationship between the parents' behavior and that of their children during their adulthood. To test this issue, we estimate the following model:

$$Y_{ik} = \beta_0 + \beta_1 PF_i + \boldsymbol{X_{ik}}\beta_2 + \delta_k + \varepsilon_{ik} \qquad (1)$$

Where Y_{ik} is a measure of the fertility decisions of individual i, living in the region *k*. In the first analysis, our dependent variable is the number of children that individuals decide to have. In a second analysis, that variable is defined as the probability of having 3 or more children. Similarly, the definition of our variable of interest, that is, parents' fertility decisions (PF_i), changes depending on the objective of our analysis. First, we define this variable as the parents' number of children and second as a dummy variable

[1] We define large families as those with 3 or more children in the household. Individuals from 2-partner households with, at least, 1 child under the age of 18 years old, have been included in our sample.

that takes value 1 if an individual was raised in a large family, and 0 otherwise.[2] The vector $\boldsymbol{X_{ik}}$ includes individual characteristics, such as gender, age, and level of education. Controls for unobserved characteristics of the areas of residence are added using region fixed effects, denoted by δ_k.

3. Data

We use data from the Survey of Living Conditions (SLC) of 2011, provided by the Spanish Statistical Institute, for the latest year providing information about the household characteristics when individuals were teenagers. The SLC provides rich information that allows us to identify the number of children under the age of 18 in the household, as well as the specific characteristics of each household during individuals' adolescence, such us the composition of the household. We use data from the Intergenerational Transmission of Poverty included in the SLC, which allows us to capture parents' attitudes related to their fertility decisions. We restrict our sample to those individuals having children. Our main sample contains 6,282 observations of individuals aged 26 to 60.

Table 1 presents the summary statistics for the main variables by region. The first two columns show large variations in the fertility decisions across the Spanish regions, ranging from around 2 children per individual and 38% of large families in Melilla to an average of 1.57 children and only a 5% of large families in Aragón. The data reveals that individuals have 1.68 children in Spain on average and only 9% of the individuals in our sample belong to a large family. Columns 3 and 4 include the summary statistics for parents' fertility outcomes when individuals where young. Comparing these columns, we can deduce, although not in all regions, a relationship between the fertility decisions of individuals in our sample and those of their parents. Fewer differences are observed in terms of age and gender composition. Male adults are 49 percent of the sample and the age of the individuals is around 43 years, on average. The raw data reveals some dissimilarities across regions in the level of education. Overall, 12 percent of individuals have completed primary school, with the lowest percentage being from Madrid (6%), and the highest from Melilla (25%). Regarding those who have completed at least secondary school, the lowest percentages are observed among those from País Vasco (34%), and the highest among those from Melilla (63%). Finally, 36% of

[2] Following Marcén and Morales (2019), we use a linear probability model for the sake of simplicity. Our results are maintained applying a probit model when using a dichotomous dependent variable.

respondents report having completed a university degree, with this ranging from just 6% in the case of individuals from Melilla, to 59% in the case of those from País Vasco.

4. Results

Table 2 presents the estimated coefficients for Eq. (1). As the existing literature shows, the higher the level of education, the lower the number of children that women decide to have (Marcén and Morales, 2018). This mainly occurs because of the increase in the opportunity costs of time for those more educated individuals (Becker and Barro, 1988). The impact of age follows an inverted U-shape, achieving the maximum at 44 years old, which is in line with the literature suggesting that the older the individuals, the more likely are those individuals to have a greater number of children (Marcén and Morales, 2018). With respect to our variable of interest, the higher the parents' number of children, the higher the number of children that individuals have (see column 1). However, this effect appears to be quite small. We find that if the parents' mean number of children increases by one, there is an increase of around 0.04 children born to the individuals in our sample. Living in a large family during adolescence is also related to a higher probability of having 3 or more children in the future. We find that being raised in a large family, increases the probability of belonging to a large family in the future by around 3% (see column 2).

A greater impact is found when analyzing heterogeneity effects by educational level in columns 3 to 6. The intergenerational transmission of fertility culture is detected among both subgroups, with the magnitude of the cultural effect being more than 50% greater when the sample of low educated individuals is considered. We find that if the parents' mean number of children increases by one, there is an increase of around 0.09 children born to the low educated individuals in our sample, and coming from a large family increases the probability of being part to a large family in the future by around 6%. Although we use a gender-balanced sample, we have also divided the sample by gender to explore the possibility of gender issues driving our results. As can be seen in columns 7 to 10, we find that the impact of parents' fertility decisions, remains statistically significant and positive, regardless of the gender of individuals, however,

the magnitude of the effect seems to be slightly higher in the case of females, pointing to a more important role of culture in fertility decisions among females than males.[3]

To reinforce our results, we run some robustness checks in Table 3. In columns 1 and 2, we repeat our analysis by using a sample of individuals older than 40 years old. Those individuals constitute an interesting sample in our analysis, since variations in the number of children born would be expected to be quite insignificant. We find that the impact of parents' fertility decisions remains statistically significant and positive. The set of individual and household characteristics has been enlarged in columns 3 and 4. As prior researchers show, marital status or economic characteristics can affect fertility decisions (Ahn and Mira, 2003; Bellido and Marcen, 2014). Thus, we include controls for whether individuals are currently married and whether individuals live in a household at risk of poverty. As can be seen, the effect on our variable of interest is still detected after controlling for all these characteristics in both columns. We can reach the same conclusion when we add additional controls for the regions in columns 5 and 6. We introduce GDP per capita, female labor force participation, and the unemployment rate.[4] It is worth noting that the inclusion of this set of observable characteristics, which can also influence the fertility decisions (Ahn and Mira, 2002; Brewster and Rindfuss, 2000; Engelhardt et al., 2004), does not alter our estimates. Thus, since individuals in our sample appear to be sensitive to their parents' behavior, we can interpret our results as evidence of the existence of the intergenerational transmission of fertility decisions in Spain.

5. Conclusions

In recent decades, there has been a considerable decline in the Spanish fertility rate, with that reaching levels below the replacement rate set at 2.1 children per woman. Thus, identifying the channels through which culture impacts fertility decisions may have important implications for policy makers, planners, and economists who make different strategies regarding fertility decisions in the society. The aim of this paper is to show that fertility attitudes in Spain can be transmitted vertically, that is, from parents to their children. This study suggests that individuals' fertility behavior may be partly determined by their parents' previous fertility decisions. Specifically, our results show

[3] These results are consistent with prior literature showing a higher effect of culture among females and low educated individuals (Marcén and Morales, 2019)

[4]Data come from the Spanish Statistical Institute.

that the higher the parents' number of children, the higher the number of children that individuals decide to have. Moreover, individuals living in large families during childhood are more likely to belong to a large family in the future. Our findings also point to a more important role of culture in fertility decisions among females and low educated individuals. All in all, despite the limitations of the data, this study must be considered as first evidence of the effect of the intergenerational transmission of fertility decisions in Spain.

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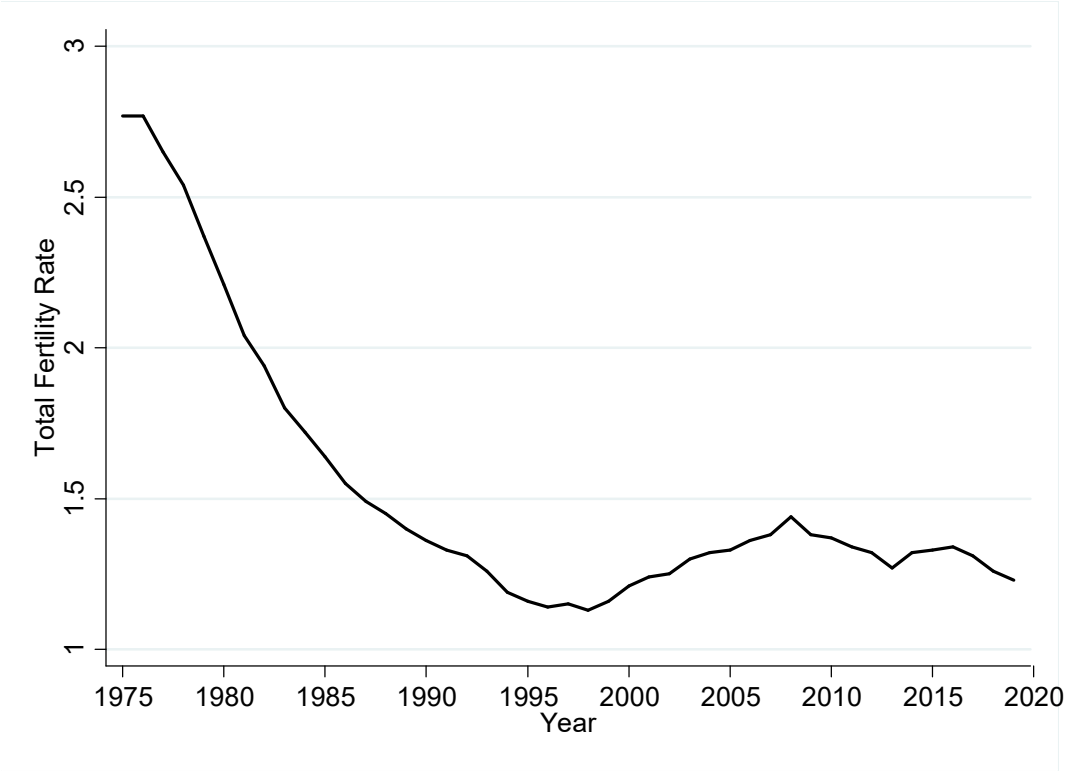
Figure 1: Evolution of the total fertility rate in Spain from 1975 to 2019



Notes: Data come from the Spanish Statistical Institute

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Table 1: Summary statistics

Region	Mean number of children	Proportion of large families	Parents' mean number of children	Proportion of parents' large families	Age	Man	Primary school	Secondary school	University degree	Obs
Andalucía	1.74	0.11	2.12	0.40	41.97	0.49	0.15	0.53	0.31	772
Aragón	1.57	0.05	1.99	0.28	42.67	0.49	0.09	0.55	0.35	319
Asturias	1.57	0.06	2.09	0.38	43.57	0.48	0.07	0.58	0.36	228
Canarias	1.62	0.09	2.08	0.39	43.17	0.49	0.17	0.47	0.32	264
Cantabria	1.64	0.10	1.87	0.23	42.98	0.47	0.10	0.54	0.35	175
Castilla y León	1.67	0.06	2.11	0.38	44.12	0.50	0.13	0.52	0.34	395
Castilla-La Mancha	1.76	0.10	2.06	0.33	42.52	0.50	0.10	0.59	0.30	418
Cataluña	1.66	0.11	2.13	0.35	42.60	0.48	0.16	0.45	0.34	648
Ceuta	1.94	0.19	2.42	0.53	40.47	0.51	0.21	0.48	0.27	77
Comunidad Valenciana	1.62	0.09	2.01	0.31	42.27	0.49	0.07	0.60	0.32	560
Extremadura	1.83	0.11	2.16	0.42	44.08	0.49	0.18	0.50	0.31	252
Galicia	1.61	0.06	1.97	0.30	42.93	0.49	0.08	0.46	0.45	261
Illes Balears	1.63	0.08	2.14	0.35	41.54	0.48	0.13	0.62	0.24	191
La Rioja	1.70	0.10	2.20	0.43	42.10	0.48	0.10	0.59	0.31	226
Madrid	1.69	0.11	2.07	0.37	43.37	0.49	0.06	0.45	0.48	612
Melilla	2.06	0.38	2.00	0.25	37.56	0.38	0.25	0.63	0.06	16
Murcia	1.74	0.10	2.01	0.33	41.01	0.49	0.18	0.57	0.24	258
Navarra	1.73	0.10	2.17	0.40	43.34	0.49	0.11	0.37	0.52	241
País Vasco	1.61	0.08	2.02	0.32	44.14	0.48	0.07	0.34	0.59	369
Mean	1.68	0.09	2.08	0.36	42.77	0.49	0.12	0.51	0.36	
Std. Dev.	0.64	0.29	0.79	0.48	7.10	0.50	0.32	0.50	0.48	

Notes: The sample contains 6,282 observations of individuals aged 26 to 60

Table 2: Main results

Dependent variable	(1) Number of children	(2) Large family	(3) Number of children	(4) Large family	(5) Number of children	(6) Large family	(7) Number of children	(8) Large family	(9) Number of children	(10) Large family
Parents' number of children	0.043***		0.087***		0.038***		0.032**		0.054***	
	(0.010)		(0.029)		(0.011)		(0.011)		(0.015)	
Parents' large family		0.028***		0.063**		0.026***		0.022**		0.033***
		(0.009)		(0.024)		(0.009)		(0.010)		(0.009)
Age	0.180***	0.029***	0.130**	0.019	0.180***	0.028***	0.173***	0.025***	0.210***	0.040***
	(0.014)	(0.004)	(0.059)	(0.032)	(0.019)	(0.006)	(0.019)	(0.006)	(0.016)	(0.006)
Age2/100	-0.205***	-0.033***	-0.164**	-0.023	-0.201***	-0.031***	-0.190***	-0.026***	-0.248***	-0.048***
	(0.016)	(0.005)	(0.063)	(0.035)	(0.023)	(0.007)	(0.023)	(0.007)	(0.018)	(0.007)
Male	-0.013*	-0.003	0.026	-0.012	-0.015	-0.002				
	(0.007)	(0.003)	(0.042)	(0.014)	(0.009)	(0.002)				
Primary school	-0.587***	-0.366***					-0.559***	-0.378***	-0.608***	-0.351***
	(0.088)	(0.057)					(0.129)	(0.088)	(0.096)	(0.074)
Secondary school	-0.639***	-0.393***					-0.592***	-0.389***	-0.677***	-0.393***
	(0.089)	(0.062)					(0.130)	(0.084)	(0.076)	(0.072)
University degree	-0.630***	-0.377***					-0.579***	-0.368***	-0.677***	-0.383***
	(0.091)	(0.067)					(0.130)	(0.088)	(0.086)	(0.078)
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,282	6,282	802	802	5,480	5,480	3,063	3,063	3,219	3,219
R-squared	0.069	0.043	0.094	0.055	0.059	0.013	0.065	0.044	0.084	0.046

Note: The sample, obtained from Spanish Living Conditions Survey 2011, consists of individuals with children aged 26 to 60 A sample of individuals who have completed less than college has been included in columns 3 and 4. A sample of individuals who have completed at least secondary school has been used in columns 5 and 6. Males have been included in columns 7 and 8 and females in columns 9 and 10. Estimates are weighted. Robust standard errors, clustered by region, are in parentheses. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

Table 3: Simple robustness checks

Dependent variable	(1) Number of children	(2) Large family	(3) Number of children	(4) Large family	(5) Number of children	(6) Large family
Parents' number of children	0.033***		0.037***		0.043***	
	(0.008)		(0.012)		(0.010)	
Parents' large family		0.033**		0.024***		0.028***
		(0.012)		(0.007)		(0.008)
Age	0.148	0.029	0.171***	0.029***	0.181***	0.029***
	(0.087)	(0.032)	(0.013)	(0.005)	(0.015)	(0.004)
Age2/100	-0.176*	-0.033	-0.193***	-0.032***	-0.206***	-0.033***
	(0.088)	(0.032)	(0.015)	(0.006)	(0.017)	(0.005)
Male	0.055***	0.012**	-0.017**	-0.004	-0.013*	-0.003
	(0.016)	(0.004)	(0.006)	(0.003)	(0.007)	(0.003)
Primary school	-0.505***	-0.318***	-0.489***	-0.336***	-0.582***	-0.365***
	(0.116)	(0.077)	(0.076)	(0.051)	(0.086)	(0.057)
Secondary school	-0.516***	-0.337***	-0.496***	-0.347***	-0.639***	-0.392***
	(0.121)	(0.081)	(0.080)	(0.053)	(0.087)	(0.060)
University degree	-0.393***	-0.295***	-0.454***	-0.319***	-0.630***	-0.376***
	(0.125)	(0.088)	(0.085)	(0.058)	(0.090)	(0.066)
Married			0.256***	0.042***		
			(0.054)	(0.014)		
Currently household at risk of poverty			0.268***	0.094***		
			(0.038)	(0.025)		
GDP pc					0.014**	0.006***
					(0.007)	(0.002)
Unemployment rate					10.801***	3.897***
					(3.330)	(1.172)
Female labor force participation					-0.010*	-0.002
					(0.006)	(0.001)
Region fixed effects	Yes	Yes	Yes	Yes	No	No
Observations	3,827	3,827	6,282	6,282	6,282	6,282
R-squared	0.065	0.037	0.106	0.059	0.065	0.041

Note: The sample, obtained from Spanish Living Conditions Survey 2011, consists of individuals with children aged 26 to 60. Individuals older than 40 years have been included in columns 1 and 2. Estimates are weighted. Robust standard errors, clustered by region, are in parentheses. *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.